

**METHOD TO CHARACTERIZE MATERIAL USING MATHEMATICAL
PROPAGATION MODELS AND ULTRASONIC SIGNAL**

ABSTRACT

5 The invention is directed to a system and method for detecting defects in a
manufactured object. These defects may include flaws, delaminations, voids, fractures,
fissures, or cracks, among others. The system utilizes an ultrasound measurement
system, a signal analyzer and an expected result. The signal analyzer compares the
signal from the measurement system to the expected result. The analysis may detect a
10 defect or measure an attribute of the manufactured object. Further, the analysis may be
displayed or represented. In addition, the expected result may be generated from a
model such as a wave propagation model. One embodiment of the invention is a laser
ultrasound detection system in which a laser is used to generate an ultrasonic signal.
The signal analyzer compares the measured ultrasonic signal to an expected result.
15 This expected result is generated from a wave propagation model. The analysis is then
displayed on a monitor.